

STANDARD PROCEDURE G-6051

PROGRAM: **Standard Work Aids**

PROJECT: **Cost Estimating Methodology**

SUBJECT: **Basis of Estimate Information (BOE)**

Authorized by: _____
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Dated on _____

Total Pages 6

1.0 PURPOSE

- 1.1 The purpose of this standard procedure is to share with the reader the process flow or techniques one has to go through to complete a Basis of Estimate

2.0 SCOPE

- 2.1 Every Cost Estimate must have a Basis of Estimate (BOE) as it shares with the reader how you determined what the cost will be.
- 2.2 Why Worry About the Basis of Estimate and Cost?
 - 2.2.1 NASA needs to be able to make independent assessments of the Cost Risk and the Cost Realism of each project to reduce the chance of project failure.
 - 2.2.2 Some consequences of inadequate assessments are:
 - 2.2.2.1 Cancellation
 - 2.2.2.2 De-scope of the project
 - 2.2.2.3 Project cancellation due to overruns
 - 2.2.2.4 Reduced operational period
 - 2.2.3 The more accurate the Basis of Estimates, the more accurate cost estimates become which, in turn, enables us to plan, implement and execute more accurately. If we are able to better plan, implement and execute more accurately we will be able to negotiate with Headquarters and the Office of Management and Budget in a more positive light.

3.0 REFERENCE DOCUMENTS

- 3.1 Bob Walker, Project Controllers Forum. Group Project Control Director, Kitaoka Group, October 24, 2002
- 3.2 ESSP Step 2 Proposals From a Cost Perspective, Claude Frenier, Office of Earth Science, NASA Headquarters, 2001
- 3.3 NASA Cost Estimating Handbook 2004, <http://ceh.nasa.gov/> Responsible NASA Official David Graham

4.0 DEFINITIONS AND ACRONYMS

- 4.1 Basis of Estimate: How you determined what the cost will be.

5.0 RESPONSIBILITIES

- 5.1 Anyone who establishes an estimate for a task, project . . . or program is required to document the Basis of Estimate for the recommended action.

6.0 METHODS, METHODOLOGIES, OR SPECIFICATIONS

- 6.1 Basis Of Estimate: How you determined what the cost will be. Some examples are:

- 6.1.1 Catalog price
- 6.1.2 Vendor quote
- 6.1.3 Vendor Rough Order of magnitude (ROM) or Not to Exceed (NTE) quote
- 6.1.4 Parametric estimate
- 6.1.5 Detailed breakdown of time and materials to build it
- 6.1.6 Similar to one built on another program last year (analogy)
- 6.1.7 "Engineering judgment" (SWAG)
- 6.1.8 Every cost in the proposal should have a Basis of Estimate!

- 6.2 What is a Basis of Estimate (BOE)? A Basis of Estimate is a document that:

- 6.2.1 Captures all aspects of the elements and variables that comprise an estimate for a task
- 6.2.2 Provides full details about how the estimate for a particular Work Breakdown Structure (WBS) element was developed
- 6.2.3 A necessary tool to facilitate a common understanding of the scope of each work element
- 6.2.4 A document of historical importance

- 6.3 Why Do We Create BOEs?

- 6.3.1 To validate that the estimate is realistic and credible
- 6.3.2 To provide evidence of the above for audit purposes
- 6.3.3 To ensure that everyone agrees regarding the scope of work, etc., of each task
- 6.3.4 To facilitate process improvement in estimating
- 6.3.5 Because it makes sense

6.4 Contents of a Good BOE

- 6.4.1 WBS Number
- 6.4.2 Task Title
- 6.4.3 Statement of Work (SOW) Reference
- 6.4.4 Specs Reference
- 6.4.5 Task Description
- 6.4.6 Period of Performance
- 6.4.7 Reference Basis and Where it is Located
- 6.4.8 State Why Said Basis Was Used
- 6.4.9 How Adjusted and Why
- 6.4.10 Include any Other Information Required to Validate

6.5 Focus on Inputs

- 6.5.1 Should define anything that is required BEFORE the task can start
- 6.5.2 May be internal or external
- 6.5.3 Facilitates understanding of task drivers
- 6.5.4 Feeds logic in the Resource Loaded Network (RLN)
- 6.5.5 Provides support in the event of a dispute

6.6 Focus on Outputs

- 6.6.1 Lists all the products that are a result of the effort on the task
- 6.6.2 May be formal or informal
- 6.6.3 Helps reduce unpriced deliverables
- 6.6.4 Feeds the logic in the RLN
- 6.6.5 Provides additional checklist items to assess task completion status

6.7 Focus on Assumptions:

- 6.7.1 Must capture all assumptions that factored into estimate development
- 6.7.2 May be tied to inputs/outputs
- 6.7.3 CFI/Contractor Furnished Equipment (CFE) are prime areas to delineate assumptions
- 6.7.4 Concerted effort needs to be made to capture any underlying assumptions as well

6.8 Focus on Rationale:

- 6.8.1 The “heart” of the BOE
- 6.8.2 Provides the details of “how” the estimate was developed
- 6.8.3 Identifies the applied methodologies
- 6.8.4 Identifies the variables that factored into the estimate
- 6.8.5 Rationale provides the foundation of the estimate’s credibility and reasonableness

6.9 Focus on Resource Estimates:

- 6.9.1 Breaks down the summary resource estimates of the rationale into smaller elements
- 6.9.2 Labor hours are decomposed into labor category/bid level hours
- 6.9.3 Other Direct Charges (ODCs), etc., are quantified
- 6.9.4 Needs to be consistent with team in place or a realistic representation of a future team

7.0 What If Part Of Our Estimate Is Parametric?

- 7.1 If you’ve used parametric cost models to develop a part of your estimate, or to confirm the total cost, provide
 - 7.1.1 Name of cost model used
 - 7.1.2 Detailed list of items included in the estimate
 - 7.1.3 Input parameters
 - 7.1.4 Sensitivity of point estimate to changes in input parameters
 - 7.1.5 Explain why you believe this is the most credible estimate.

8.0 METRICS

- 8.1 Annually – compare Basis of Estimate elements to actual cost incurred.
Goal is +/- 10%

9.0 NECESSITY

- 9.1 NASA must be able to make independent assessments of the Cost Risk and the Cost Realism of each project to lessen the chance of project failure and to adequately provide a realistic budget to accomplish the necessary work. It is because of these sound financial principles that it is necessary for us to calculate a Basis of Estimate. Additionally, the last step in our cost estimating process is to update cost estimates on a regular basis. (i.e. Cost Estimating Process. (NASA Cost Estimating Handbook 2004, Chapter 3.3 Pages 24-29) Task 12 – Update Cost Estimates on a Regular Basis)

10.0 FORMS